

Patent Claims

1. Washing nozzle for use on vehicles for applying a liquid cleaning or washing medium, comprising at least one nozzle channel (8, 19) in a nozzle body (2, 15, 15a), comprising at least one nozzle opening (5, 20, 20a) formed by the nozzle channel for the exit of at least one nozzle jet (10, 11, 14), comprising at least one supply line (9.1) which opens into the nozzle channel (8) for supplying the cleaning medium, and comprising at least one section (7a, 19.1.2) in the nozzle channel (8, 19) for generating at least one primary or main jet from the cleaning medium, characterized by means (9.2; 19.2, 22) for acting on the at least one main jet with a collision jet within the nozzle body (2, 15, 15a) in a collision and/or mixing chamber (4.2; 19.1.3) provided upstream of the nozzle opening (5, 20, 20a) in the flow direction.
2. Washing nozzle according to Claim 1, characterized by at least one region for generating the at least one main jet, said region being provided upstream of the collision and/or mixing chamber (4.2; 19.1.3) in the flow direction.
3. Washing nozzle according to Claim 2, characterized in that the region for generating the main jet is formed by at least one narrowing (7a, 19.1.2) and/or by an adjoining expansion (4.2; 19.1.3) in the nozzle channel in the flow direction.
4. Washing nozzle according to Claim 3, characterized in that the narrowing is formed by at least one channel section (7a) having a reduced cross section or part (19.1.2) of a channel section (19.1) having a reduced cross section.

5. Washing nozzle according to Claim 4, characterized in that the at least one channel section (7a) is formed on a nozzle insert or chip (3) which is accommodated in the nozzle body (2) or in a recess (4.1) therein.
6. Washing nozzle according to Claim 5, characterized in that the nozzle insert (3) is provided on an outer surface with at least one channel groove (7) which forms the narrowed nozzle channel section (7a).
7. Washing nozzle according to one of the preceding claims, characterized in that the nozzle channel (8) has at least two channel sections (7a) having a reduced cross section.
8. Washing nozzle according to Claim 7, characterized in that the axes of the channel sections (7a) enclose an angle (α) with one another and open out in a diverging manner from a chamber (6a) connected to a supply line (9.1) into the collision and/or mixing chamber (4.2).
9. Washing nozzle according to one of the preceding claims, characterized in that the at least two channel sections (7a) having a reduced cross section are arranged with their axes in a common plane (XZ plane).
10. Washing nozzle according to Claim 9, characterized in that, when the washing nozzle (1) is formed with a slot-shaped nozzle opening (5) in order to generate a fan-shaped or flat nozzle jet (11), the common plane (XZ plane) lies parallel to the longer side of the slot-shaped nozzle opening (5).

11. Washing nozzle according to one of the preceding claims, characterized in that the means for acting upon the at least one main jet with the at least one collision jet are formed by at least one opening (9.2.1) of a second supply line (9.2) for the cleaning medium which forms the collision jet, said opening (9.2.1) opening into the collision and/or mixing chamber (4.2).
12. Washing nozzle according to Claim 11, characterized in that the second supply line (9.2) or the opening (9.2.1) thereof is oriented in an axis direction perpendicular or almost perpendicular to a nozzle axis (DA) and/or to the common plane (XZ plane) of the channel sections (7a) having a reduced cross section.
13. Washing nozzle according to Claim 11 or 12, characterized in that the second supply line (9.2) or the opening (9.2.1) thereof is oriented in an axis direction perpendicular or almost perpendicular to the longer side of the nozzle opening (5).
14. Washing nozzle according to one of the preceding claims, characterized in that the nozzle channel (19) has at least two parallel channel sections (19.1, 19.2) which are each connected to a supply line (21) for the liquid cleaning medium and of which one channel section (19.1) has the region (19.1.2) for forming the main jet and the other channel section (19.2) ends downstream of the region (19.1.2) for forming the main jet in the flow direction and is connected there to the collision and/or mixing chamber (19.1.3).
15. Washing nozzle according to Claim 14, characterized in that the other channel section (19.2) is connected over its entire length to the first channel section (19.1).

16. Washing nozzle according to Claim 14 or 15, characterized in that the channel sections are connected to a common supply line (21).

17. Washing nozzle according to one of Claims 14 - 16, characterized in that the first channel section (19.1) has, starting from the supply line (21), in a first axis direction (X-axis), one after the other, a first part-section (19.1.1) which extends in the flow direction, then a second part-section (19.1.2) which narrows and expands again in at least a second axis (Z-axis) perpendicular to the first axis (X-axis), and then a third part-section (19.1.3) which increasingly widens in at least a cross-sectional axis (Z-axis) and ends in the nozzle opening (20, 20a).

18. Washing nozzle according to Claim 17, characterized in that the first part-section (19.1.1) and/or the second part-section (19.1.2) and/or the third part-section (19.1.3) have a constant or almost constant dimension in a third axis (Y-axis) perpendicular to the second axis (Z-axis).

19. Washing nozzle according to Claim 17 or 18, characterized in that the other channel section (19.2) has a constant or almost constant width in the second axis direction (Z-axis), for example a width which is equal to or almost equal to the width of the first part-section (19.1.1) of the first channel section (19.1).

20. Washing nozzle according to one of the preceding claims, characterized in that the other channel section (19.2) has a cross section which is smaller than the cross section of the first channel section (19.1).

21. Washing nozzle according to one of the preceding claims, characterized in that the other channel section (19.2) has in the third axis (Y-axis) a cross-sectional dimension which is smaller than the cross-sectional dimension which the first channel section (19.1) has in this third axis (Y-axis).

22. Washing nozzle according to one of the preceding claims, characterized in that the nozzle body (15) is made in two parts, and in that the nozzle channel (19) or the channel sections (19.1, 19.2) are formed by recesses or depressions on adjoining surfaces of the parts (16, 16a, 18, 18a) of the nozzle body (15, 15a).

23. Washing nozzle according to one of the preceding claims, characterized in that the end (22) of the other channel section (19.2) which is remote from the supply line (21) forms a deflection surface for deflecting the collision jet into the collision and/or mixing chamber (19.1.3).